	A	B	C	D	E	F	G	H	I
1	No.	Source Document	Section	Section Number	Page	Figure or Table Number	Comment Type (General or Specific)	Harbor-wide or Gasco-specific Issue	Comment Subject
2	1	Gasco EE/CA	Interim Area Identification	4	70		Specific	Gasco-specific	Administrative Mechanism
3	2	Gasco EE/CA	Applicable or Relevant and Appropriate Requirements and To Be Considered Initiatives	3.5	65		General	Gasco-specific	ARARs
4	3	Gasco EE/CA	Compliance with ARARs	7.2.3.1	190		General	Gasco-specific	ARARs
5	4	Gasco EE/CA	Compliance with ARARs	7.2.3.2	191		General	Gasco-specific	ARARs
6	5	Gasco EE/CA	FEMA Flood Rise Requirements	8.2.2.2.2	251		General	Gasco-specific	ARARs
7	6	Gasco EE/CA	Indicator Chemicals (ICs)	2.5.1.2	25		Specific	Gasco-specific	COCs
8	7	Gasco EE/CA	Appendix J				General	Gasco-specific	Cost Estimate
9	8	Gasco EE/CA	Appendix J				General	Gasco-specific	Cost Estimate
10	9	Gasco EE/CA	Appendix J				General	Gasco-specific	Cost Estimate
11	10	Gasco EE/CA	Appendix J				General	Gasco-specific	Cost Estimate
12	11	Gasco EE/CA	Appendix J				General	Gasco-specific	Cost Estimate
13	12	Gasco EE/CA	Appendix J				General	Gasco-specific	Cost Estimate
14	13	Gasco EE/CA	Appendix J				General	Gasco-specific	Cost Estimate
15	14	Gasco EE/CA	Appendix J				General	Gasco-specific	Cost Estimate
16	15	Gasco EE/CA	Appendix J				General	Gasco-specific	Cost Estimate
17	16	Gasco EE/CA	Appendix J			Table 1-3	Specific	Gasco-specific	Cost Estimate
18	17	Gasco EE/CA	Introduction	1		Figure 1.2.3-1	Specific	Gasco-specific	Data Presentation
19	18	Gasco EE/CA	Adjacent Upland Properties	2.2.1		Figure 2.2.1-1	Specific	Gasco-specific	Data Presentation

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1	Comment	Reviewer	Action to be Taken Category	Gasco Priority
2	First paragraph, last sentence. Final boundary for the GASCO sediment sites will be defined in the Portland Harbor ROD. The text should be revised to note the final boundary will be defined in the Portland Harbor ROD.	CDM/S	Revise	Low
3	EPA's ability to waive ARARs is limited to specific instances such as the fund lead waiver or the technical impracticability waiver. The circumstances under which ARARs may be waived by EPA should be discussed.	CDM/S	Comment	Medium
4	Regarding the FEMA floodrise requirement, the EE/CA "interprets the threshold as "less than 0.005 feet," based on the assumption that hydraulic model results less than 0.005 feet would be rounded to 0.00 feet and therefore meet the criterion." This seems inconsistent with the threshold used for the McCormick and Baxter cap project and in any case should be confirmed.	CDM/S	Evaluate	Medium
5	The EE/CA Report states: All of the alternatives are expected to comply with the five primary ARARs evaluated in detail, with the possible exceptions of certain WQS/NRWQC and FEMA flood regulations. The implications of this statement should be discussed. For example, the placement of capping material may need to be offset through removal of material to allow attainment of the FEMA floodrise requirements.	CDM/S	Evaluate	Medium
6	NW Natural will need to consider the aggregate impacts of all habor-wide capping activities when evaluating the FEMA flood rise requirement. This section should state this more clearly.	EPA	Revise	Medium
7	The basis for the statement, "Generally, for upland data evaluations, PCBs and DDx are not reviewed because the Gasco and Siltronic properties have not been identified as sources of these chemicals" should be provided.	Yakama - Ridolfi	Confirm	Low
8	Paragraph 2, Purpose and Organization Section: The statement is made that U.S Environmental Protection Agency guidance (EPA 540-R-00-002) was followed in developing the cost estimates. In comparing the cost estimates to the EPA guidance document, the opinion of probable costs does not comply with this guidance manual or with any defensible professional estimate structure with backup documentation. There are numerous deficiencies in the presentation and details of Probable Cost Summary. Examples include: no use of element or sub-element details that show units of measure and unit costs; no provision of detailed cost back-up; no presentation to support a management level review; and no discussion of the time expected to achieve remedial action objectives and goals (which affects monitoring level of effort and cost). The estimate should be revised to comply with the EPA guidance document including, at a minimum, presentation of the quantity build-ups; units of measure and unit rates; summaries of the time periods over which the costs occur; back-up and supporting documentation for the costs; and expected times to achieve remediation goals.	CDM/S	Revise	High
9	Because there is no supporting data on unit rates, derivation of quantities, or presentation of execution details (such as the element and sub-element structures as described in the EPA guidance document for cost estimating) one cannot support the accuracy of the cost estimates nor the validity of the cost comparison between alternatives. The absence of supporting documentation does not allow an independent review and/or verification of relative costs. The reviewer is expected to accept the cost values on faith, not data. Please supply the data and cost back-up to support the evaluation.	CDM/S	Revise	High
10	The scope of work categories that are shown are too diverse and broad of scope to have been developed by valid parametric methods. For example, a cost is provided for Shoreline Excavation ranging from $570,000 to about $2.6 million without describing the nature of the work, productivity, the type of machinery, labor rates, or other relevant data from which one can evaluate the accuracy of the cost estimate. Please provide adequate detail of the type of operation occurring to allow evaluation of the cost by an	CDM/S	Revise	High
11	There is no presentation of unit rates (these must be back-calculated from total cost and unit quantities), no indication of whether unit rates are inclusive or exclusive of overhead and profit, no indication of whether these rates are for material only or not, and no sources or back-up for the unit rates, such as vendor or supplier quotes. Please detail the costs that are included in the unit rates.	CDM/S	Revise	High
12	If, as cited in the text, data from past projects was used, there appears to be no application of adjustment of historical pricing to 2012 values. If past cost data was used, please clarify if costs were corrected to 2012 values.	CDM/S	Revise	Low
13	If data was used from different projects, there is no indication that any location normalization was applied to the different data sources to obtain a value representative of the proposed alternatives. Please clarify.	CDM/S	Revise	Low
14	The capital costs are represented as occurring essentially in year 1 of the project, with no consideration of whether the alternatives require more than a year to implement. If the alternatives extend beyond 1 year, one would traditionally apply time-value-of-money factors and indicate those values in the calculations. Please indicate if the work occurs in the current cost year; if there are capital costs anticipated beyond the first year, please indicate as such and show any cost adjustments inclusive of the time-value-of-money or other corrections.	CDM/S	Revise	Low
15	There is inconsistency between applied percentages for indirect costs between the text and cost tables. For example, the text states that construction management and daily oversight costs are estimated at 3%, whereas Table 1-3 uses 5%. Similarly, the text states Daily Agency Oversight and Project Management at 5%, while Table 1-3 uses 3%. Please correct as appropriate.	CDM/S	Revise	Medium
16	There is no presentation of the work elements that make up the long-term maintenance activities with associated costs. There is no indication of the time-value-of-money values used to calculate the net present worth. Please provide this information. The use of percent factors in calculating indirect costs should be reviewed for reasonableness and adjusted accordingly. For example, a construction management cost of about $9.8 million is applied to Alternative 5, low cost option. If one assumes a 2 year construction project (note there is no indication by the authors as to the duration), then this cost implies about 25 full-time equivalents of Construction Management support.	CDM/S	Revise	High
17	There is a line item for Construction Management and Daily Oversight, and separate line item for Sevenson Construction Management and Project Management Team. These items appear duplicative. Please correct as necessary.	CDM/S	Revise	Low
18	The Site Location Map depicts the areas of chlorinated VOC detections off shore of the Siltronic property but does not present similar detections of aromatic VOCs detections associated with discharge of contaminated groundwater associated with MGP operations at the GASCO site. The Site Location Map should be revised to include areas of aromatic	CDM/S	Revise	Low
19	The Site Layout Figure should depict the extent of the groundwater plume at the GASCO Site (including the adjacent Siltronic property).	CDM/S	Revise	Low

	A	B	C	D	E	F	G	H	I
20	19	Gasco EE/CA	Development of Remedial Alternative Footprints	6.1			General	Gasco-specific	Development of Alternatives
21	20	Gasco EE/CA	Cleanup Materials	5.8.1	140		General	Gasco-specific	Disposal Options
22	21	Gasco EE/CA	Introduction	1	1		Specific	Gasco-specific	Editorial
23	22	Gasco EE/CA	Introduction	1	1		Specific	Gasco-specific	Editorial
24	23	Gasco EE/CA	RAO Performance Goals and Measurements	3.4	58		Specific	Gasco-specific	Editorial
25	24	Gasco EE/CA	Riverbed Characteristics/Dynamics and Sediment Transport	2.4.3.1	22		General	Gasco-specific	Editorial
26	25	Gasco EE/CA	MNR Conclusions	5.1.3	107		Specific	Gasco-specific	Editorial
27	26	Gasco EE/CA	Compliance with ARARs	7.2.3.2	192		Specific	Gasco-specific	Editorial
28	27	Gasco EE/CA	Title Page				Specific	Gasco-specific	Editorial
29	28	Gasco EE/CA	Engineered Capping	5.4.2	115		General	Gasco-specific	ESA Consultation and Mitigation
30	29	Gasco EE/CA	Identification of Remedial Action Alternatives	6		Table 6.0-2	General	Gasco-specific	Evaluation of Alternatives
31	30	Gasco EE/CA	Detailed Analysis of Alternatives	7			General	Gasco-specific	Evaluation of Alternatives
32	31	Gasco EE/CA	Overall Protection of Human Health and the Environment	8.1	242		General	Gasco-specific	Evaluation of Alternatives
33	32	Gasco EE/CA	Protection of Upland Structures	6.4.3	165		General	Gasco-specific	Evaluation of Alternatives
34	33	Gasco EE/CA	Alternative 1: No Action Detailed Analysis	7.3.1	207		General	Gasco-specific	Evaluation of Alternatives

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20	Although the EE/CA guidance recommends evaluating a limited number of alternatives, the range of alternatives evaluated only includes two removal action levels – 20 mg/kg and 1.5 mg/kg BaPEq. Consideration of additional action levels should be included. The alternatives should include a single removal emphasis and a single in-place technology emphasis alternative for each RAL. Although this action is being performed as a non-time critical removal action, because the removal decision is expected to be documented in the Portland Harbor ROD, the evaluation of an expanded set of alternatives is appropriate. Alternative 5 incorporates all of the most conservative cleanup options (e.g., large dredging footprint, rigid containment [only outside Navigation Channel], removal of all substantial product, and extensive riverbank excavation and capping), and consequently represents an appropriate "bookend" alternative to Alternative 1 (No Action). However, there is no gradation in the middle remedial alternatives that incorporate some of these elements. As a result the costs and duration of Alternative 5 far exceed other alternatives. The Draft EE/CA therefore inappropriately skews the comparative evaluation of alternatives. DEQ believes NW Natural should consider developing additional	CDM/S and DEQ	Evaluate	Medium
21	First Paragraph: The following statement needs qualification - "Any of these in-water disposal options would be appropriate for Cleanup Materials if the facilities are available for use in time for the implementation of the Gasco Sediments Cleanup Action." However, use of these CDF and CAD facilities is contingent on the material meeting the respective acceptance criteria for each facility. For example, the Terminal 4 CDF will have fairly rigid standards, especially for PCBs, which Gasco sediments may exceed.	EPA	Revise	Medium
22	First paragraph states that AOC "contemplates"…AOC does not contemplate, but it spells out the performance to be expected in remediating contaminants at the site. Choose another word or revise sentence.	CDM/S	Revise	Low
23	First paragraph, 4th sentence. EPA's remedy decision for the GASCO site will not only be documented in the Portland Harbor ROD, but EPA will also select a remedy that is compatible with other site-wide cleanup activities. The text should be revised to reflect this.	CDM/S	Revise	Low
24	First paragraph under RAO3. Last sentence reads "…assuming a high consumption rate of 18 grams…". The word "high" should be removed.	CDM/S	Revise	Low
25	The draft FS Report states: "The reaches between RM 5 and 7 and RM 10 and 11.8, where the river is relatively narrow, contain areas of small-scale net erosion interspersed with areas of net deposition." The FS Report also states : "The model predicts that, over the long term, net erosion would be expected in the channel of RMs 5 to 7." The stretch of the Willamette River between RM 5 and 7, is an area that includes a high percentage of non-cohesive sediments relative to the rest of the Portland Harbor site. The grain size distribution pattern between RM 5.5 and 6.5 is significantly different than the patterns elsewhere within Portland Harbor with a high percentage of coarse grained, non cohesive sediments present in across much of this reach with the exception of a small band of finer grained material along the GASCO shoreline (See FS Report Figure 2.1-3). Similarly, FS Report Figure 2.1-4 demonstrates that the across much of the reach between RM 5 and 7, the river is primarily erosional. In addition the Sediment Transport Evaluation identified this reach of the river as in dynamic equilibrium. These points should be included in the discussion of sediment stability. This section also includes the following statement: "Further into the navigation channel exists a relatively high-energy sediment transport zone, as evidenced by time-series bathymetry and sand grain size in this area." The lines of evidence for sediment stability presented in Figure 5.1.1.2-1 shows that much of the near shore area is category 1 (recovery is uncertain) or category 2 (recovery is somewhat less certain). Given significant concentrations of PAHs are present in surface sediments offshore of the GASCO site even though operations ceased in the 1950's demonstrates that although sediment deposition is occurring, reworking of the sediment bed continues to re-expose PAH contaminated sediments at the site.	CDM/S	Revise	Low
26	Second to last sentence has the word "undergoing" twice. The paragraph discussing MNR processes in the GASCO SMA will need to be revised once further direction is provided by EPA on how MNR is evaluated after review of the Portland Harbor draft FS.	CDM/S	Revise	Low
27	The last sentence refers to "following actions…" but no actions are described. The Yakama believe there is some text missing .	Yakama - Ridolfi	Revise	Low
28	Report title should read Engineering Evaluation/Cost **Analysis** GASCO Sediments Cleanup Site	CDM/S	Revise	Low
29	The implementability discussion should consider the likelihood of endangered species act consultation on the cap design and placement. As demonstrated by the capping project at the Zidell site, the use of cobbles as an armoring layer may be required. The effectiveness of cobbles at preventing erosion at the GASCO site should be discussed.	CDM/S	Evaluate	Medium
30	EE/CA Alternatives and RALs Comparison to Portland Harbor FS: The EE/CA provides alternatives 1, 2a, 2b, 3, 4 and 5. EE/CA Table 6.0-2 compares the EE/CA and FS alternatives. Even though EE/CA Table 6.0-2 provides a comparison of "technologies options", the substantial differences discussed below are not shown on the table (only mentioned in a footnote). Of course by the nature of the specific evaluations, the EE/CA is more detailed; however overall, the EE/CA alternatives are substantially different than the FS alternatives and more discussion is needed concerning these differences.	CDM/S	Develop	High
31	Reduction of Toxicity, Mobility or Volume through Treatment: The evaluations of this criteria are discussed for each alternative in Section 7 (e.g., 7.4.4 for Alternative 2a, 7.5.4 for Alternative 2b, 7.6.4 for Alternative 3, etc.). The text of these sections simply state how much active capping, how much stabilization with cement and how much dewatering is being performed. There is no discussion on how these actions affect toxicity, mobility or volume. These evaluations should be added.	CDM/S	Revise	Medium
32	Third paragraph, third sentence. The statement "…the alternatives with more removal of sediment and riverbank soils results in unavoidable resuspension, release, and residuals that reduce the overall protection of human health and the environment provided by these alternatives…." Although resuspension cannot be completely avoided, acknowledgement should be added that it can be mitigated if proper containment is in place.	CDM/S	Evaluate	High
33	The EE/CA states: "To support this significant bank reconfiguration, it is likely that Siltronic would need to temporarily shut down the facility, which may result in permanent loss of business and the likely termination of operations at the facility. Further, the Fab 1 building is constructed as slab on grade, such that significant structural damage resulting from undermining due to layback excavation is reasonably anticipated. Structural damage to Fab 1 will also result in permanent lost revenue and likely termination of operations at the facility. Similarly, it is anticipated that the foundation for the FAMM tank may not support the extent of layback excavation proposed in Alternative 5." However, no geotechnical or economic analysis is provided to support these conclusions. It would seem that many of the effects described here could be mitigated. Furthermore, this demonstrates the need to look at additional RALs beyond the 1.5 mg/kg BaPEq used for Alternatives 4 and 5. There should also be further discussion of different technologies that do not create the same potential structural problems noted in this section. For example, removal could be truncated in the near shore area and the placement of surface caps placed within areas of shallow sediment and bank areas.	CDM/S	Evaluate	Medium
34	The statement that the no action alternative "is projected to achieve long-term surface water concentrations post-remedy that are the same as all the other alternatives" warrants further investigation. Benzo(a)pyrene surface water samples collected in the vicinity of the GASCO site exceed water quality standards. As a result, it seems reasonable to assume that remedial efforts that remove and/or isolate PAH contamination will reduce surface water concentrations following remedy completion. This is documented in the modeling results which show that surface water concentrations for the no action alternative are higher than the other alternatives following removal action implementation.	CDM/S	Revise	High

	A	B	C	D	E	F	G	H	I
35	34	Gasco EE/CA	Alternative 2b Detailed Analysis	7.5.1	216		General	Gasco-specific	Evaluation of Alternatives
36	35	Gasco EE/CA	Detailed Analysis of Alternatives	7?			General	Gasco-specific	Evaluation of Alternatives
37	36	Gasco EE/CA	Detailed Analysis of Alternatives	7?			General	Gasco-specific	Evaluation of Alternatives
38	37	Gasco EE/CA	Detailed Analysis of Alternatives	7?			General	Gasco-specific	Evaluation of Alternatives
39	38	Gasco EE/CA	Oregon Environmental Cleanup Law	8.2.2.1	249		General	Gasco-specific	Evaluation of Alternatives
40	39	Gasco EE/CA	EPA Guidance	9.1.1	266 - 271		General	Gasco-specific	Evaluation of Alternatives
41	40	Gasco EE/CA	Monitored Natural Recovery	7.2.4.2.1	195		Specific	Gasco-specific	Fate and Transport Model/MNR
42	41	Gasco EE/CA	Alternative 1: No Action Detailed Analysis	7.3.1	207		General	Gasco-specific	Fate and Transport Model/MNR
43	42	Gasco EE/CA	Alternative 2a Detailed Analysis	7.4.1	211		General	Gasco-specific	Fate and Transport Model/MNR
44	43	Gasco EE/CA	Alternative 2a Detailed Analysis	7.4.3	213		General	Gasco-specific	Fate and Transport Model/MNR
45	44	Gasco EE/CA	Surface Sediment RAOs	8.1.1	243		General	Gasco-specific	Fate and Transport Model/MNR

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35	EPA does not agree that the no-action alternative will achieve RAOs and meet EPA's protectiveness standard. In addition, it is unclear whether Alternative 2a will achieve RAOs and meet EPA's protectiveness standard. Alternative 2b is the first alternative that may reasonably be expected to achieve RAOs and meet EPA's threshold criteria. Alternative 2b consists of removal with a sand cover within the navigation channel with a mix of capping and removal with either a cap or sand cover in the nearshore areas.	CDM/S	Comment	Low
36	Draft EE/CA SMAs assume that excavation of river sediment near the toe of slope requires 3:1 riverbank layback. Although the Draft EE/CA notes the final design would likely result in a steeper bank slope, the Draft EE/CA assumes a 3:1 slope for evaluating alternatives. This assumption results in excavation footprints that damage or destroy uplands groundwater SCMs and endanger the Siltronic building. Since remedies are evaluated and selected in the EE/CA, the assumption of a 3:1 slope in the Draft EE/CA inappropriately and prematurely eliminates consideration of more aggressive sediment removal alternatives. Also, given the presence of Siltronic's building and that uplands SCMs will be realities on the ground during implementation of the in-water sediment remedy, DEQ believes temporary engineering measures designed to stabilize the slope and protect existing facilities that also allow for sediment excavation (e.g., mid-bank to top-of-bank sheetpile walls) should be considered.	DEQ	Evaluate	Medium
37	The comparative analysis of alternatives concludes that all alternatives are protective and meet sediment RAOs and that the only balancing factor that differentiates between alternatives is short-term effectiveness (i.e., the more sediment dredging the greater the detrimental impact to the environment). This is largely based on NW Natural's position that: • Rigid containment during dredging is ineffective and potentially harmful (national examples of problematic applications are discussed in detail, but not the successful local application with similar contaminants at Arco); • The F&T model predicts natural burial of contaminated sediments; • Waiting 35+ years for MNR to achieve RAOs/RGs is acceptable; • The upland HC&C system provides an adequate long-term remedy for contaminated subsurface river sediment; and • Remedial alternatives involving sediment and riverbank removal will compromise existing structures (e.g., Siltronic building) and/or destroy uplands SCMs. As discussed above, making different assumptions and providing a more graduated range of alternatives would likely lead to different conclusions. In other words, it appears that the Draft EE/CA heavily weights remedial alternatives evaluations to favor minimal remedial action. Based on this information DEQ concludes the Draft EE/CA is less objective than it should be.	DEQ	Evaluate	High
38	The EE/CA displays a bias toward low cost, limited action in several ways. First, the short-term and long-term effectiveness of MNR seems over-emphasized and the risk associated with releases should MNR not be as effective as predicted are not explicit. Second, the use of containment systems to reduce releases during dredging are under-valued, particularly sheet pile walls. Third, the effectiveness of groundwater containment to induce river flow into the sediment at significant distances from the shore seems overly optimistic. Fourth, the risk associated with dense non-aqueous phase liquids (DNAPLs) in the subsurface is minimized and there is no acknowledgement that this material is considered problematic under DEQs definition of hot spots. The bias toward limited action alternatives is exemplified by the detailed and comparative analyses. In the Yakama's opinion, it is not credible to state that the no action alternative for one of the most highly contaminated sediment sites in Portland Harbor meets the threshold criteria of overall protection of health and the environment and will achieve ARARs. The extent of this bias calls into question the effectiveness evaluations for all of the alternatives. The Yakama believe that the alternative selected should include removal of NAPL and removal or capping of sediment with less mobile substantial product.	Yakama - Ridolfi	Evaluate	High
39	It is unclear how Alternative 2 demonstrates a higher cost threshold for removal. Alternative 2 does not remove or treat any material. NW Natural should provide the basis for the higher cost threshold.	CDM/S	Resolve	Medium
40	The 17 principles indentified in this section serve as excellent guidelines for making remedial action decisions at contaminated sediment sites. However, the degree to which the underlying analysis supports the statements varies. For example, the short-term effects noted in item 14 may be mitigated though various BMPs and the CSM refinement discussed in item 4 should acknowledge the uncertainty in understanding long-term contaminant reductions through MNR.	CDM/S	Evaluate	High
41	The last two sentences, beginning with: "During such an extreme flood event…" describe erosion, downstream transport, and a return to pre-flood equilibrium. Essentially, some of the contamination is getting washed downstream and is replaced by other sediment from upstream areas that has lower concentrations of GASCO COCs. The Yakama believe is not a well-controlled remedy and should not be considered as an effective application of MNR.	Yakama - Ridolfi	Revise	High
42	The EE/CA Report states that the No Action alternative "is expected to meet sediment RAOs 2, 3, 6, and 7." This determination is based solely on the results of the contaminant fate and transport model and is subject to a high level of uncertainty. The uncertainty of this outcome should be discussed in this section.	CDM/S	Revise	High
43	Alternative 2b relies on MNR to achieve remedial action objectives adjacent to and within the navigation channel. This is an area that is subject to propwash, maintenance dredging, is dominated by coarse grained materials (demonstrating a lack of deposition) and has higher surface than subsurface sediment concentrations. These empirical lines of evidence are far more reliable than the results of the fate and transport modeling effort that is being used to demonstrate that Alternative 2b is expected to meet RAOs. This alternative is unlikely to meet the threshold criteria of protectiveness and meeting ARARs. Additional justification should be provided for the effectiveness of MNR in this	CDM/S	Revise	High
44	Minimization of Potential Long-term Sediment Recontamination - This section states that upstream concentrations will cause contaminant concentrations to rise following capping of the nearshore area. This does not seem to take into account the reliance on MNR in off shore areas. As noted in the comment above, empirical evidence suggests that MNR is not likely to occur at this location. In addition, sediment concentrations in this area are higher than background levels. Thus the statement that contaminant concentrations will rise but still be protective should be justified more clearly.	CDM/S	Revise	High
45	The EE/CA report states that "a combination of active remedies and MNR would result in substantially reduced long-term sediment concentrations, as indicated by the fate and transport modeling projections previously summarized." Empirical evidence suggests that MNR may be of limited effectiveness in at least some areas within the GASCO removal action area. There is an over reliance on the fate and transport modeling results over empirical data and the EE/CA fails to acknowledge the uncertainty in the modeling results.	CDM/S	Revise	High

	A	B	C	D	E	F	G	H	I
46	45	Gasco EE/CA	Surface Sediment RAOs	8.1.1	243		General	Gasco-specific	Fate and Transport Model/MNR
47	46	Gasco EE/CA	EPA Guidance	9.1.1	268		Specific	Gasco-specific	Fate and Transport Model/MNR
48	47	Gasco EE/CA	Other Short Term Impacts	8.5.4	260		General	Gasco-specific	Green Remediation
49	48	Gasco EE/CA	Dredge Material Transport and Disposal	5.8	142		General	Gasco-specific	Health & Safety
50	49	Gasco EE/CA	Sub-sediment Management Area Development	4.5	92		General	Gasco-specific	Incorporation of Site-Specific Data
51	50	Gasco EE/CA	Sediment Quality	2.5.2	26-27		General	Gasco-specific	Nature and Extent of Contamination
52	51	Gasco EE/CA	Riverbank Soils Quality	2.5.7	35		General	Gasco-specific	Nature and Extent of Contamination
53	52	Gasco EE/CA	Dredge Elutriate Testing	2.6.2	37 - 38		General	Gasco-specific	Nature and Extent of Contamination
54	53	Gasco EE/CA	Screening of Gasco Site Data with Portland Harbor Site-Specific PRGs	2.7.2	42 - 43		General	Gasco-specific	Nature and Extent of Contamination
55	54	Gasco EE/CA	Substantial Presence of Product	4.1.1	72		Specific	Gasco-specific	Nature and Extent of Contamination
56	55	Gasco EE/CA	Alternative 2a Detailed Analysis	7.4.2	212		Specific	Gasco-specific	Oregon Hot Spots and PTM
57	56	Gasco EE/CA	Introduction	1		Figure 1.2.4-1	Specific	Gasco-specific	Project Schedule
58	57	Gasco EE/CA	Refined Remedial Action Objectives	3.3	55 - 56		General	Gasco-specific	RAOs, RGs and RALs
59	58	Gasco EE/CA	RAO Performance Goals and Measurements	3.4	57		General	Gasco-specific	RAOs, RGs and RALs
60	59	Gasco EE/CA	Methodologies to Evaluate NCP Criteria and Common Elements of the Evaluation	7.2			Specific	Gasco-specific	RAOs, RGs and RALs
61	60	Gasco EE/CA	Chemicals of Interest	2.5.1.1	24		General	Gasco-specific	RAOs, RGs and RALs
62	61	Gasco EE/CA	Sediment Quality	2.5.2	27		General	Gasco-specific	RAOs, RGs and RALs
63	62	Gasco EE/CA	Screening of Gasco Site Data with PH Site-Specific PRGs	2.7.2	43		General	Gasco-specific	RAOs, RGs and RALs
64	63	Gasco EE/CA	Overall Protection of Human Health and the Environment	7.2.2.1	182		General	Gasco-specific	RAOs, RGs and RALs
65	64	Gasco EE/CA	Appendix B				Specific	Gasco-specific	Remedial Design

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46	The EE/CA Report states: "...empirical data on sedimentation rates, upstream sediment loads, bathymetry, and sediment core profiles reviewed in Section 5.1 indicate deposition of low contaminant concentration sediments (i.e., in the range of background for PAHs) from upstream, particularly in areas with elevated COC concentrations over the long term. This supports the conclusion that a combination of active remedies and MNR would result in substantially reduced long-term sediment concentrations, as indicated by the modeling projections previously summarized." While it is true that the empirical data suggest that MNR may be effective in limited areas, the elevated levels of PAH contamination in surface sediments offshore of GASCO despite the fact that the release occurred many decades ago suggests that MNR will not be effective. In addition, areas adjacent to and within the navigation channel are even less likely to be amendable to MNR due to the presence of coarse grain sediments, anthropogenic effects such as propwash and dredging and the presence of surface sediments at higher concentrations than subsurface sediments.	CDM/S	Revise	High
47	Item 6. Third sentence. The majority of GASCO sediments have not recovered naturally over the years, as this site continues to demonstrate unacceptable risks to human health and ecological receptors.	CDM/S	Revise	High
48	A discussion of EPA Region 10 Clean and Green requirements should be added to the section describing ways to mitigate air pollution impacts. EPA's Clean and Green Policy and Region 10 requirements are located at http://yosemite.epa.gov/R10/extaff.nsf/programs/greencleanups. Green remediation technologies and practices should be considered for all work activities. A comprehensive set of greener approaches to site cleanup may be found at http://www.clu-in.org/greenremediation.	EPA	Revise	High
49	This section does not include a discussion of worker protection that may be necessitated by higher levels of contaminants present in some dredged material. Worker safety considerations need to be reflected in this discussion on landfill selection for both Special and Hazardous Wastes.	EPA	Revise	Medium
50	The physical features presented in this section should be expanded to include areas of erosion/deposition, debris areas, areas targeted for future redevelopment, habitat areas, slope, presence of underwater utilities, presence of bedrock outcrops within the sediment bed, hot spots and areas with principle threat material (e.g., NAPL), areas with active upland sources or where source control is required to prevent recontamination.	CDM/S	Revise	Low
51	The discussion of the nature and extent of sediment contamination should include a discussion of naphthalene. Naphthalene is the most soluble of the PAH compounds and is present at much higher levels at the GASCO site than more volatile compounds such as benzene, toluene, ethylbenzene, and xylenes (BTEX). When assessing contaminant migration, understanding the potential for naphthalene discharges is important.	CDM/S	Revise	Medium
52	It should be noted that areas of blue soil staining indicative of cyanide contamination have been detected in riverbank soils at the GASCO site.	CDM/S	Revise	Low
53	This section should include a discussion of the water quality sampling that was performed during the 2005 removal action the GASCO site. Although the 2005 removal action targeted the tar body, and thus would be expected to generate higher concentrations of dissolved constituents, the information may be use in the assessment of short term impacts during dredging activities.	CDM/S	Revise	Low
54	Somewhere in this section there should be explicit recognition that the levels of contamination offshore of the GASCO site are well above screening criteria and PRGs established at the Portland Harbor site for the purposes of the FS. A table that presents this information would be useful.	CDM/S	Revise	Low
55	EPA's November 28, 2011 comments on the October 19, 2011 Technical Briefing requested a discussion of the removal and capping of the tar body in 2005. While the 2005 removal action is discussed in Sections 2.2.4 and 4.1.1, a figure delineating the areas of remaining tar below and downriver of the FAMM dock was not provided as requested in Technical Briefing General Comment #4.	CDM/S	Develop	Low
56	The Yakama believe that Alternative 2a seems unlikely to comply with Oregon's hot spot policy, so this alternative does not comply with ARARs (see previous comments regarding identification of hot spots of contamination).	Yakama - Ridolfi	Identify	High
57	The Project Schedule should be updated to reflect the latest understanding of the Portland Harbor Proposed Plan and ROD development schedule.	CDM/S	Revise	Low
58	The surface water RAOs focus on fluxes from contaminated sediments within the project area. This should be expanded to include groundwater fluxes.	CDM/S	Confirm	Medium
59	The performance goals focus exclusively on BaP. While this may be the driver, there are other contaminants in the area that, while they did not originate from the GASCO site (e.g., PCBs, DDx) are comingled with contamination from the GASCO site and which may require evaluation to ensure protectiveness.	CDM/S	Evaluate	High
60	Although the removal action is focused on benzo(a)pyrene, the Tribes believe the evaluation of the alternatives should address the remedial goals for all relevant contaminants.	Tribes - Stratus	Confirm	Medium
61	DEQ considers the list of COI included in Section 2.5.1.1 (see page 24) to be incomplete without "gasoline range hydrocarbons." It is unclear why this constituent was not included in the SOW and carried forward in the Draft EE/CA, as some of the highest concentrations in Portland Harbor are detected in sediments offshore of the Gasco site. Based on this information, DEQ considers gasoline range hydrocarbons to be an important site-specific COI. Furthermore, given gasoline range hydrocarbons are present above baseline ecological screening levels in offshore sediment, the Draft EE/CA should consider concentrations of this constituent to be a COPC in water and sediment for the project.	DEQ	Resolve	High
62	The EE/CA describes BaP sediment trap concentrations immediately downstream of the GASCO site in the 300 – 1,000 ug/kg range while concentrations immediately upstream are in the 20 – 50 ug/kg range. This section should note that while the downstream concentrations are below the RALs selected for evaluation in the Portland Harbor FS, they exceed the direct contact PRG of 423 ug/kg and demonstrate that the GASCO site continues to be a source of downstream PAH contamination.	CDM/S	Revise	Medium
63	Section 2.7.2 (see page 43) of the Draft EE/CA does not evaluate RG levels below background or less than 0. DEQ believes that risk-based goals that are below background should highlight the importance of background as a remedial goal.	DEQ	Revise	Low
64	Although fish tissue is used to evaluate risks associated with human fish consumption, fish consumption AWQC for benzo(a)pyrene are exceeded offshore of GASCO and elsewhere within Portland Harbor. Under CERCLA, achieving ARARs is a threshold criteria that must be met. Although there are watershed sources of carcinogenic PAHs, it is also true that GASCO represents a source of PAH surface water contamination and the EE/CA should evaluate whether reduction in surface water levels associated with the various removal alternatives is sufficient to achieve AWQC as part of the ARARs evaluation.	CDM/S	Evaluate	Medium
65	Although no archaeological deposits were observed during the removal of the "tar body," the Tribes are supportive of using an archaeologist to monitor removal actions for the Gasco sediments cleanup site. Additionally, we recommend that NW Natural consider developing an Inadvertent Discovery Plan during remedial design.	Tribes - Stratus	Comment	Low

	A	B	C	D	E	F	G	H	I
66	65	Gasco EE/CA	Adequacy of Controls	8.3.6	255		General	Gasco-specific	Residuals Management
67	66	Gasco EE/CA	Project Area Characterization	2	10		General	Gasco-specific	Risk Evaluation
68	67	Gasco EE/CA	Portland Harbor Draft FS RAOs	3.2	48		Specific	Gasco-specific	Risk Evaluation
69	68	Gasco EE/CA					General	Gasco-specific	Risk Evaluation
70	69	Gasco EE/CA	Dredging/Removal	7.2.4.2.3	197		General	Gasco-specific	Risk Reduction vs. Mass Removal
71	70	Gasco EE/CA	RAO 2	3	48		Specific	Gasco-specific	Site-Wide Evaluation vs Relevant Exposure
72	71	Gasco EE/CA	Development of Remedial Alternative Footprints	6.1	148 - 150	Figure 6.1-1 thru 6.1.5	Specific	Gasco-specific	SMAs
73	72	Gasco EE/CA	Site Uses Sub-SMA Designation	4.5.1	92		General	Gasco-specific	SMAs
74	73	Gasco EE/CA	Source Control Activities and Status	2.3			General	Gasco-specific	Source Control
75	74	Gasco EE/CA	Source Control Activities and Status	2.3			General	Gasco-specific	Source Control

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66	The adequacy of controls evaluation should take into account the long-term effectiveness of the sand cover to be placed following removal for Alternatives 2b, 3,4 and 5.	CDM/S	Revise	Medium
67	First paragraph, last sentence states that EE/CA SRE is consistent with the Portland Harbor Risk Assessments. As there is still some discussion regarding the regulatory acceptance of this risk assessments, the EE/CA SRE should be based upon the final approved risk assessments.	CDM/S	Confirm	High
68	End of First Paragraph: The breast-feeding exposure pathway was not used to develop remediation goals (RG) in the EE/CA per an agreement with EPA and the Yakama believe it should be included.	Yakama - Ridolfi	Confirm	Medium
69	Lines of evidence and hazard quotients greater than 1 from the BERA appear to be missing from the Draft EE/CA presentation and analysis. For example, surface water lines of evidence were inappropriately dropped through the management recommendations in the Portland Harbor draft FS and therefore were not included in the Draft EE/CA. This also applies to transition zone water. DEQ believes these additional lines of evidence need to be added back to the Draft EE/CA.	DEQ	Revise	Medium
70	The EE/CA report states: "mass removal is not a goal supported by the sediments guidance." While it is true that mass removal alone should not be the focus, NW Natural should realize that mass removal, as it relates to long-term risk reduction, may be relevant. For example, it may be possible, through mass removal, to have greater confidence in long term effectiveness.	CDM/S	Revise	Low
71	This section describes calculating surface area weighted average concentrations (SWACs) for shoreline ½ River Miles (RM). The Yakama believe it would be preferable to average over the GASCO area of interest to reduce inclusion of areas that are not associated with the site.	Yakama - Ridolfi		
72	The remedial alternatives include a spatially complicated mix of MNR, EMNR, capping, and removal as modified by factors such as docks, future dredging areas, etc. The Yakama believe the patterns are so complex that it would be infeasible to construct the alternatives as conceived. The GASCO site is small enough that a more plausible footprint could have been developed for each alternative .	Yakama - Ridolfi	Evaluate	Medium
73	The area should not be "parcelized" to small sub-areas that it would be impossible to implement a remedy or remedies.	CDM/S	Evaluate	Medium
74	Consistent with DEQ's September 22, 2011 letter commenting on the Revised Interim Design Report , the remedial action objectives (RAOs) for groundwater source control are to prevent migration of contaminated groundwater from the uplands to the Willamette River in a manner that minimizes DNAPL mobilization resulting from groundwater source control measures (SCMs) along the portion of the shoreline where DNAPLs occurs. Preventing contaminated groundwater from migrating to the river involves controlling and containing groundwater in the Fill water-bearing zone (WBZ) and the Alluvium WBZ. To control and contain groundwater in the Fill WBZ, DEQ accepted NW Natural's approach of using a fully-penetrating interceptor trench. The Alluvium WBZ SCM is a well-based hydraulic control and containment (HC&C) system designed to reverse hydraulic gradients from the river towards the uplands. Source control discussions presented in the Draft EE/CA (e.g., see Section 2.3.1.1) emphasize the status of the Alluvium WBZ HC&C system. However, source control will not have been achieved without preventing groundwater from both the Fill WBZ and the Alluvium WBZ from migrating to the river. NW Natural proposes to construct the interceptor trench concurrently with the riverbank cleanup included in the in-water sediment remedy. This proposal, including NW Natural's rational, was previously presented in the Revised Interim Design Report. DEQ did not approve NW Natural's proposal, determining that postponing trench construction until sometime after the in-water project is initiated will significantly delay source control of the Fill WBZ. DEQ communicated our disagreement with NW Natural's proposal and our comments on the length, alignment, and sequence and schedule for construction of the interceptor trench in letters dated September 22	DEQ	Revise	High
75	NW Natural is developing a groundwater model to evaluate the performance and operation of the groundwater source control measures (SCMs). According to Section 2.3.1.1, the groundwater model and currently available data are used to predict the offshore extent of seepage control that will be achieved by the HC&C system subsequent to implementation. In addition, the groundwater model is used in conjunction with a sediment cap fate and transport model to assess the isolation cap effectiveness in Section 5.4. NW Natural indicates in Section 2.3.1.1 that the model predicts the HC&C system will reverse the groundwater gradients in the Alluvium WBZ over an area encompassing approximately 1,800 feet of shoreline and extending about 700 feet out and under the Willamette River. NW Natural further indicates that within this area: 1) seepage of groundwater from the Alluvium WBZ into the river will be prevented; and 2) concentrations of COI in sediment will decrease over time as surface water migrates from the river into the sediments. In general DEQ disagrees with these assertions and finds them to be unsupported for the following reasons: • There is no documentation provided in the Draft EE/CA regarding the model used to generate Figure 2.3.1.1-1. Although NW Natural indicates the model uses conservative assumptions, information about the model set-up, input parameters, and the site conditions to which the model is calibrated are not provided. Furthermore, the model output upon which Figure 2.3.1.1-1 is based is not included in the Draft EE/CA and DEQ is not aware of this information being previously provided to EPA and/or DEQ for review. • The uplands groundwater model referenced in the Draft EE/CA is currently undergoing development. According to NW Natural, the model will not be suitable for predictive purposes until the full-scale HC&C system is constructed and tested late in 2012, and that data is incorporated into the model in 2013. Consequently, the descriptions of model predictions presented in the Draft EE/CA should be considered preliminary and subject to change in the future. • NW Natural's assertion that COI concentrations in sediment will decline over time appears to presume that contaminated sediments are absent. As indicated in Section 8.3.6 (Adequacy of Controls), all of the remedial alternatives evaluated in the Draft EE/CA will leave residual contamination. Given the magnitude and distribution of contaminated sediment in the Gasco Sediment Project area, concentration trends of COI in sediment will ultimately be more dependent on, and controlled by the remaining residual sediment contamination. In other words, desorption of COI into the dissolved phase will have a negligible effect on concentrations in sediment and mass reduction overall, especially in areas where sediment is impacted by left-in-place MGP waste.	DEQ	Confirm	High

	A	B	C	D	E	F	G	H	I
76	75	Gasco EE/CA	Source Control Activities and Status	2.3			General	Gasco-specific	Source Control
77	76	Gasco EE/CA	Source Control Activities and Status	2.3			Specific	Gasco-specific	Source Control
78	77	Gasco EE/CA	RAO Performance Goals and Measurements	3.4	61		General	Gasco-specific	Source Control
79	78	Gasco EE/CA	Buried Contamination Analysis	4.6	95		General	Gasco-specific	Source Control
80	79	Gasco EE/CA	Detailed Analysis of Alternatives	7			General	Gasco-specific	Source Control
81	80	Gasco EE/CA	Gasco Source Control Activities and Status	2.3.1	16		General	Gasco-specific	Source Control
82	81	Gasco EE/CA	Groundwater Source Controls	2.3.1.1	16	Figure 2.3.1.1-1	Specific	Gasco-specific	Source Control
83	82	Gasco EE/CA	Minimization of the Riverbank Infiltration Pathway	6.4.1	163		General	Gasco-specific	Source Control
84	83	Gasco EE/CA	Overall Protection of Human Health and the Environment	7.2.2.2	183		Specific	Gasco-specific	Source Control
85	84	Gasco EE/CA	Riverbank Remediation	7.2.2.3.3	188		Specific	Gasco-specific	Source Control
86	85	Gasco EE/CA	Magnitude of Residual Risk – Minimization of Potential for Groundwater	7.2.4.1.3	193 - 194		Specific	Gasco-specific	Source Control
87	86	Gasco EE/CA	Detailed Analysis of Alternatives	7?			General	Gasco-specific	Source Control

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76	For purposes of identifying remedial alternative (Section 6), conducting detailed analyses of remedial alternatives (Section 7), and completing comparative analyses of alternatives (Section 8), the Draft EE/CA appears to presume the HC&C system will be a long-term fixture in the uplands that maintains the model-predicted hydraulic gradients from the river towards the uplands illustrated in Figure 2.3.1.1-1 for at least 100 years. However, the HC&C system is not identified in the Draft EE/CA as an element of the in-water remedy. In addition, the uplands feasibility study (FS) has not been initiated. Consequently, the HC&C system has not been subject to detailed analysis against uplands FS remedy selection factors. DEQ believes including the presence, operation, and influence of the HC&C as a baseline condition leads to overly favorable predictions regarding the long-term effectiveness of in-water remedial alternatives. Based on this information, DEQ believes it is not appropriate to rely on the HC&C to address subsurface contaminated sediment. That said, an active cap could be an effective approach to manage flux of contaminated groundwater to the river (contaminated from subsurface river sediment or otherwise). The Draft EE/CA should discuss the HC&C system in terms of being a common element of each of the in-water remedial alternatives, and fully explain how the presence or absence of the HC&C system influences predictions of the performance and effectiveness of alternatives.	DEQ	Revise	High
77	The success of any remedy at the Gasco sediments cleanup site depends in large part on the success of source control at the Gasco and Siltronic properties. The Tribes believe the predictions of flow reversal from the groundwater model should be validated before the sediment remedy is finalized.	Tribes - Stratus	Evaluate	High
78	The EE/CA indicates that implementation of the "upland groundwater extraction system will result in a reversed groundwater gradient in the alluvial sediments" (page 61, paragraph 2). The extent of offshore groundwater capture and seepage rates are shown in Figure 2.3.1.1-1. The area of reverse flow (i.e., river to groundwater) is extensive and extends over 1,800 ft along the shoreline and 700 feet into the river. A groundwater model was used to design the groundwater extraction system (CDR, Anchor QBEA 2012b). The model extent is used to support selection of alternatives particularly related to capping in areas of substantial product (i.e., the EE/CA states that this is appropriate because flow will not be from the sediment into the river). The area of reserved flow seems very large and the modeling results should be evaluated in more detail. This detailed evaluation should present the uncertainties associated with the groundwater model and the implications associated with this uncertainty. Implications may result in a smaller area of flow reversal than shown on Figure 2.3.1.1-1 as controlled by the yet to be completed and fully tested hydraulic containment and control system.	CDM/S	Evaluate	High
79	The EE/CA states that modeling of subsurface transport due to groundwater flow "was not conducted for the GASCO Sediments Site because an underlying assumption for all EE/CA alternatives, including the no action alternative, is that source controls will be in full operation at the time of construction." Further analysis should be provided that demonstrates the degree to which groundwater source control measures will limit or minimize groundwater flow to the Willamette River such that this important transport pathway does not need to be considered.	CDM/S	Evaluate	High
80	The Draft EE/CA indicates that Alternative 3 excludes observations of liquid substantial product which do not occur within 0 to 3-feet below mudline because deeper occurrence was assumed to have limited potential for migration to the overlying surface sediments. DEQ notes that the physical migration of the product is not the only scenario that needs to be evaluated in the Draft EE/CA. For example, both liquid and non liquid product below a depth of 3-feet is a source for dissolved phase contaminant migration which can recontaminate cover material, impact sediment pore water, and load the cap. The Draft EE/CA needs to evaluate this contaminant migration and exposure pathway independent of the predictions made regarding the long-term influence of the HC&C system on hydraulic gradients between the uplands and river.	DEQ	Evaluate	High
81	It should be noted that effective groundwater source control is a prerequisite for an effective in-water remedy due to the potential for DNAPL migration to the Willamette River and the elevated levels of dissolved contaminants present in groundwater at the GASCO site. This is particularly true for remedies that involve the use of in place controls such as capping and in-situ treatment. Accordingly, their needs to be a presentation on the current uncertainty associated with the groundwater model and the implications of this uncertainty on the predicted success and effectiveness of the source control as well as how this uncertainty effects the in-water remedy alternatives evaluation.	CDM/S	Evaluate	High
82	The text and figure describe and show a light green hatched area where "the groundwater gradient is reversed, thereby preventing seepage of groundwater into the Willamette River." This area extends approximately 750 feet into the river. The Yakama believe it is implausible that flow reversal to this distance can be achieved. A discussion with Dana Bayuk, DEQ's site manager for the upland source control project, indicated that a preliminary model has been developed but the full-scale system will be going through a shake-down period through the end of 2012, which will be used to calibrate and verify the groundwater (MODFLOW) model. In the meantime, Mr. Bayuk doesn't think that NW Natural has supported the contention that there will be such a large capture zone for the extraction system.	Yakama - Ridolfi	Evaluate	High
83	Further discussion of the use of the impermeable geomembrane barrier to mitigate rainwater infiltration into the riverbank should be provided. Clarification should be provided on the goal of the geomembrane, the effectiveness of geomembrane at meeting the goal, and other technologies (e.g., removal) that could be utilized to achieve the same goal. Also, the cost and implementability factors associated with the use of this material should be described.	CDM/S	Evaluate	Medium
84	The last paragraph states: "The upland groundwater extraction system will result in a reversed groundwater gradient in the alluvial sediments that will cause COCs in river sediments to move toward upland extraction system where groundwater is captured and treated over time." This is a working hypothesis that has not been proven. In the Yakama's opinion, it is unlikely that an upland system can influence groundwater over such a large area. If the model indicates that it can, the model is probably poorly conceptualized, i.e. the layering or material properties are unrealistic .	Yakama - Ridolfi	Evaluate	High
85	No active remedy is proposed for the riverbank soil but it seems that most of that soil has not been sampled because of the presence of riprap, which armors against erosion. The Yakama question whether there is enough data to state that there is no product emanating from the riverbank.	Yakama - Ridolfi	Confirm	Low
86	As stated in the comment regarding Section 7.2.2.2, the Yakama does not believe that the groundwater extraction system as currently proposed is an effective means of minimizing groundwater impacts.	Yakama - Ridolfi	Evaluate	High
87	DEQ's March 21, 2008 letter commenting on the DNAPL/Groundwater FFS (see reference below) informed NW Natural that planning, design, and implementation of uplands SCMs must take into consideration future riverbank work. Since that time DEQ has consistently maintained: • Future riverbank work should not interfere with installation and/or operation of uplands SCMs and/or DNAPL/groundwater treatment system equipment, buildings, or piping; and • Uplands SCMs should not limit NW Natural's ability to develop a complete and effective approach to addressing the riverbank. Draft EE/CA Alternatives 4 and 5 results in removal of uplands SCMs (i.e., Fill WBZ interceptor trench and Alluvium WBZ HC&C system) due to slope layback assumptions and then use this outcome to argue for elimination of these alternatives. For clarification, DEQ does not consider damage and/or destruction of uplands SCMs to be justifications for removing otherwise valid remedial alternatives from consideration in the Draft EE/CA. DEQ's comment regarding the limitations of the 3:1 slope assumption and the need for the Draft EE/CA to evaluate temporary engineering measures applies here. (Reference: Anchor QEA, LLC. 2007. "Groundwater/DNAPL Source Control Focused Feasibility Study – NW Natural 'Gasco' Site," received October 12 [amended November 9	DEQ	Evaluate	High

	A	B	C	D	E	F	G	H	I
88	87	Gasco EE/CA	Appendix F Appendix H				General	Gasco-specific	Source Control
89	88	Gasco EE/CA	Buried Contamination Analysis	4.6			Specific	Gasco-specific	Substantial Product
90	89	Gasco EE/CA		?			General	Gasco-specific	Substantial Product
91	90	Gasco EE/CA	Substantial Product Observations Summary	2.5.3	28 - 29	Figure 2.5.3-1 and Tables 4.4.1-1 and 4.4.1-2	Specific	Gasco-specific	Substantial Product
92	91	Gasco EE/CA	Potential Future Maintenance Dredge Areas Outside of Navigation Channel	4.6.1	96 - 97		Specific	Gasco-specific	Substantial Product
93	92	Gasco EE/CA	Alternative 1: No Action Detailed Analysis	7.3.1	207		Specific	Gasco-specific	Substantial Product
94	93	Gasco EE/CA	Alternative 2a Detailed Analysis	7.4.1	210		Specific	Gasco-specific	Substantial Product
95	94	Gasco EE/CA	Substantial Product RAO	8.1.4	246		General	Gasco-specific	Substantial Product
96	95	Gasco EE/CA	Substantial Product RAO	8.1.4			Specific	Gasco-specific	Substantial Product
97	96	Gasco EE/CA					General	Gasco-specific	Substantial Product
98	97	Gasco EE/CA	Engineered Capping	5.4			Specific	Gasco-specific	Technology Evaluation - Capping
99	98	Gasco EE/CA	2005 Removal Action	2.2.4	15		Specific	Gasco-specific	Technology Evaluation -
100	99	Gasco EE/CA	Active Capping	5.5.1.2	119		General	Gasco-specific	Technology Evaluation - Capping
101	100	Gasco EE/CA	Active Capping	5.5.1.2	120		General	Gasco-specific	Technology Evaluation - Capping
102	101	Gasco EE/CA	Appendix I	Appendix I 2.1.3.2			General	Gasco-specific	Technology Evaluation - Capping
103	102	Gasco EE/CA	Removal	5.6			Specific	Gasco-specific	Technology Evaluation - Dredging

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88	DEQ considers the riverbank risk screening and hot spot screening evaluations described in the Draft EE/CA and documented in Appendix F and Appendix H to be preliminary. As indicated by NW Natural, the Draft EE/CA screened riverbank data available from the top of bank down to approximately 13 feet NAVD88. NW Natural is performing a human health and ecological risk assessment of the Gasco Site uplands (Gasco Uplands RA) that will integrate and analyze riverbank and uplands data consistent with the human health and ecological exposure areas identified for the uplands. The hot spot determination for the Gasco Site uplands will be conducted following completion of the Gasco Uplands RA. The Draft EE/CA should be revised to reflect the findings and conclusions of the approved Gasco Uplands RA and hot spot determination to ensure the Gasco Sediment Cleanup Action achieves uplands and in-water RGs .	DEQ	Revise	Medium
89	The Tribes believe all areas of buried contamination should be identified, regardless of river current and sediment transport modeling. Appropriate risk management decisions can then be made about how they should be addressed. Additionally, all areas of buried contamination should be discussed in the detailed evaluation of alternatives in Chapter 7.	Tribes - Stratus	Evaluate	High
90	The Tribes are supportive of a remedy for Gasco that includes removal of the majority of substantial product from the Willamette River.	Tribes - Stratus	Comment	High
91	The text begins the discussion of substantial product by differentiating between solid phase (pencil pitch and lampblack) and liquid phase (DNAPL) product. The solid phase material is further segregated between material above 13 feet NAVD88, which is considered upland and outside of the scope of the EE/CC, and material below that considered under the purview of the EE/CA. The Yakama notes that the data used to prepare figure 2.3.3-1 is presented on tables 4.4.1.-1 and 4.4.1-2, whose titles seem to be switched.	Yakama - Ridolfi	Revise	Low
92	Contaminants (and substantial product) that exceed the RAL and are within the navigation channel, and within the depth of potential future maintenance dredging, should be removed to a depth that will not impact future dredging operations .	CDM/S	Evaluate	High
93	The Yakama disagree that the No Action alternative meets the Overall Protection criterion. The sediment trap data indicate that the area is an ongoing source of PAHs to downstream areas. The presence of NAPL is an unacceptable long-term risk. The groundwater extraction system is unlikely to control migration of PAHs into the river .	Yakama - Ridolfi	Evaluate	High
94	The Yakama believe Alternative 2a is unlikely to meet the Overall protection of human health and environment criterion because the presence of NAPL is an unacceptable long-term risk and the groundwater extraction system is unlikely to control migration of groundwater and thus COCs into the river .	Yakama - Ridolfi	Evaluate	Low
95	The discussion of the substantial product RAO should focus more on the whether the costs are proportionate to the degree of risk reduction to be attained through physical removal rather than the discussion relative to downstream transport which could be managed through the water quality management controls such as sheet pile installation.	CDM/S	Revise	High
96	The Tribes believe the evaluation of whether the alternatives can meet the substantial product remedial action objective should not contain cost information, as costs should be evaluated separately from effectiveness. Additionally, it is entirely unclear whether the modeled concentrations presented in Figures 7.2.2.1-1a-b and 7.2.2.1-2a-b include any evaluation of substantial product.	Tribes - Stratus	Evaluate	High
97	Evaluation of "substantial product": As discussed in EE/CA section 2.5.3 and many other places, RAO 1 of section 3.2 of the SOW provides a preference for removal of sediments containing substantial amounts of product. According to EE/CA text on pg 29, visual observations from core and borings logs were placed in two categories: 1) substantial product that was solid (e.g., tar) and considered non-mobile and 2) substantial product that was in liquid form (e.g., liquid oil, saturated media, DNAPL layers) and considered potentially mobile. (Note: no material was identified in category 3). Except for alternative 5, most of the alternatives do not substantially address the "substantial product" identified areas in figure 2.5.3-1 with removal. Under most alternatives, many of the areas with substantial product are addressed by capping. This technology is evaluated as effective because groundwater modeling indicates that "upland source controls will prevent upland groundwater from discharging through river sediments..." As a result, the EE/CA does not appear to be consistent with the SOW.	EPA and CDM/S	Evaluate	High
98	The evaluation of the effectiveness of the engineered cap is largely based on modeling and assumptions about groundwater flow direction and velocity. The groundwater model assumes that dissolved organic compounds moving upward through the cap will undergo biodegradation and partition onto the cap material. The Tribe believes this assumption should be thoroughly evaluated with field testing before any remedy that relies on an engineered cap is implemented.	Tribes - Stratus	Confirm	Medium
99	This paragraph states that a pilot cap was placed over the primary tar deposit removal area. NW Natural should provide a discussion of the effectiveness of this cap in preventing contaminant migration.	CDM/S	Revise	Medium
100	Overall, the evaluation of the various DNAPL LOE in Section 5.5 as well as Section 3 of Appendix I seems reasonable and it seems likely that the migration pathway of greatest consequence is DNAPL serving as an ongoing source of dissolved groundwater contamination. NW Natural should review the results of the McCormick and Baxter reactive cap application with respect to groundwater flux rates, dissolved groundwater contaminant concentrations in the source area (source term) and performance monitoring results to understand the degree to which active capping technologies would be effective at the GASCO site.	CDM/S	Evaluate	Medium
101	Reactive capping technologies may be effective at controlling DNAPL transport to the Willamette River in conjunction with the upland source control action . This technology has been successfully demonstrated at the McCormick and Baxter site and in the placement of organo-clay following the 2005 removal action at the GASCO site. Post placement monitoring data collected at these sites should be evaluated and used to support the reactive capping effectiveness evaluation .	CDM/S	Evaluate	Medium
102	Key capping model parameters include porewater concentrations and Darcy velocity. Although the porewater concentrations appear reasonable (e.g., naphthalene up to 11,200 ug/l), the Darcy velocities in the area of the cap are on the order of -49 cm/yr. Darcy velocities upstream of the cap are significantly higher at 167 cm/yr. The Darcy velocities in the cap area were estimated using a the results of the groundwater source control model. It is unclear whether a Darcy velocity of -49 cm/yr is reasonable. In addition, the modeling approach assumes both anaerobic (within the cap) and aerobic (at the surface of the cap) degradation rates. While degradation may occur to some degree, the rate of degradation in the natural environment is highly variable. As a result, the model should be run assuming no degradation as a conservative case. Overall though, if the source control measure will reverse the hydraulic gradient as assumed and if the reactive capping technologies are used in areas where porewater concentrations are predicted to exceed criteria, capping may be effective. However, the long term effectiveness of the capping option will need to consider the operation and maintenance of the hydraulic control system and expected life span of the reactive capping amendment (e.g., time until breakthrough).	CDM/S	Evaluate	High
103	The Tribes believe removal via both hydraulic and mechanical dredge should be considered, and the use of silt curtains should be maintained as a potential best management practice.	Tribes - Stratus	Revise	Medium

	A	B	C	D	E	F	G	H	I
104	103	Gasco EE/CA	Removal	5.6.1	124		General	Gasco-specific	Technology Evaluation - Dredging
105	104	Gasco EE/CA	Removal	5.6.2.1	125		General	Gasco-specific	Technology Evaluation - Dredging
106	105	Gasco EE/CA	Operational Controls	5.6.3.1	127		General	Gasco-specific	Technology Evaluation - Dredging
107	106	Gasco EE/CA	Rigid Containment Barriers	5.6.3.2.2	129		General	Gasco-specific	Technology Evaluation - Dredging
108	107	Gasco EE/CA	Review Environmental Dredging Releases and Water Quality Impacts	5.6.3.3	132		General	Gasco-specific	Technology Evaluation - Dredging
109	108	Gasco EE/CA	Surface Sediment RAOs	8.1.1	243		General	Gasco-specific	Technology Evaluation - Dredging
110	109	Gasco EE/CA	Summary of Comparative Evaluation Relative to RAOs	8.1.6	247		General	Gasco-specific	Technology Evaluation - Dredging
111	110	Gasco EE/CA	Transition Zone Water Quality	2.5.6	34		General	Gasco-specific	TZW Evaluation
112	111	Gasco EE/CA	Interim Area Identification	4	4 and 70		General	Gasco-specific	U.S. Moorings
113	112	Gasco EE/CA	Results - Interim Project Area Identification	4.4			General	Gasco-specific	U.S. Moorings
114	113	Gasco EE/CA	Development of Remedial Alternative Footprints	6.1	146-150		General	Gasco-specific	U.S. Moorings
115	114	Gasco EE/CA	Development of Remedial Alternative Footprints	6.1			Specific	Gasco-specific	U.S. Moorings
116	115	Gasco EE/CA	Vessel Traffic Patterns	2.2.3	15		Specific	Gasco-specific	U.S. Moorings
117	116	Gasco EE/CA	Substantial Product Observations Summary	2.5.3	29	Figure 2.5.3-1	Specific	Gasco-specific	U.S. Moorings
118	117	Gasco EE/CA	Substantial Presence of Product	4.1.1	72		General	Gasco-specific	U.S. Moorings
119	118	Gasco EE/CA	SOW Risk Management Framework	9.1.2	271		Specific	Gasco-specific	U.S. Moorings
120	119	Gasco EE/CA					General	Gasco-specific	U.S. Moorings

	J	K	L	M
104	The use of a clean cover to address residuals will function as a cap. While the placement of clean material to isolate residuals is expected to be effective in the short term if placed immediately following the final dredge pass, evaluation of the long term effectiveness of the clean cover should be evaluated in light of the high groundwater flux at the GASCO site.	CDM/S	Evaluate	High
105	Removal of contaminated sediments using barge mounted dredging equipment with long reach excavators equipped with narrow budgets may be effective at removing shallow sediments below and adjacent to dock structures at the GASCO site. This limited removal in conjunction with post removal cap placement may be an effective approach for addressing contamination in and around non-removable structures. To further enhance long term effectiveness, active capping materials such as reactive core mats may be incorporated into the cap design. NW Natural should consider the use of these methods.	CDM/S	Evaluate	Medium
106	Based on information presented in the EE/CA, experience at other sites, and the presence of debris and structures at the GASCO site, removal activities are expected to generate significant residuals. While the placement of a sand cover once removal operations are complete is described, evaluation of the effectiveness of this sand cover at meeting the removal action objectives should be performed. In addition, based on the water quality monitoring during the 2005 removal action, significant releases are expected during dredging. The EE/CA should discuss the magnitude of these expected releases and describe potential control measures for controlling these releases.	CDM/S	Evaluate	Medium
107	The discussion of rigid containment should include discussion of the current dredging at the Diamond Alkalai site on the Passaic River. Due to the effectiveness of sheet pile enclosures water quality monitoring during the implementation of the dredging activity is no longer required. Methods to reduce releases at the Diamond Alkalai site include application of a sealant to the sheet pile joints to reduce the interlock permeability. Scour at base of the sheet pile can be mitigated by armoring methods, such as erosion control mattresses or graded rock layers, or use of sheet pile deflector walls .	CDM/S	Evaluate	Medium
108	This discussion lumps all barrier controls in one group and implies that silt curtains and rigid containment are equally ineffective (i.e., release rates observed are generally in the range of 2 to 4 percent). It seems unlikely that both barrier technologies would release the same amount of material. Further references and justification should be provided distinguishing between the effectiveness of each technology.	EPA	Revise	Medium
109	The EE/CA report states: Alternatives that include more dredging/removal (Alternatives 4 and 5) are projected to result in higher overall surface sediment concentrations (particularly for naphthalene) over substantial periods of time due to the duration of construction and the effects of dredge residuals as compared to those alternatives with more emphasis on in-place technologies and MNR. It should be noted that the use of sheet pile containment (with appropriate BMPs) may mitigate many of these effects by containing releases and perhaps allowing for work outside the dredge windows thus shortening the overall time for remediation. NW Natural should consider evaluating the	CDM/S	Evaluate	High
110	The EE/CA states that because the various alternatives achieve similar contaminant levels, the "comprehensive alternatives that include greater dredging/removal volumes and/or longer construction durations (especially Alternative 5 at 10 years' duration) provide less overall protection of human health and the environment than shorter duration alternatives that focus on in-place technologies." The evaluation of short-term impacts should be conducted as part of the short-term effectiveness. It should also be noted that alternatives that remove or effectively isolated a larger mass of contamination will score higher under long-term effectiveness and permanence.	CDM/S	Revise	High
111	The discussion of TZW should include discussions regarding the magnitude of toxicity reference values (TRVs) used to evaluate risks to aquatic life in the baseline ecological risk assessment (BERA) for the Portland Harbor site. The chemicals with the highest hazard quotients should be highlighted.	CDM/S	Revise	Low
112	EE/CA Interim Project Area Identification: As stated on pg 4 and Section 4 (pg 70), the EE/CA presents an "interim Project Area representing a further refinement of the lateral and vertical extent of SMA 9U remedial action areas". The 2009 Gasco Sediment Site Area of Interest includes the U.S. Moorings property; it is noted that SMA 9U and the EE/CA interim Project Area do not include the U.S. Moorings property. The EE/CA interim Project Area includes the riverbank ("below the top of the bank as defined in the SOW"). Figure 2.5.3-1 show the extent of substantial product, figure 4.4.2-1 show the comprehensive Benthic Risk Assessment Boundary, and Figure 4.4.3-1 shows the RAL contours for BaPEq. These three evaluations combine to form the interim Project Area shown in figure 4.4.6-1. The EPA will be evaluating the data to determine if portions of the U.S. Moorings area belong within the interim Project Area.	CDM/S	Evaluate	High
113	The U.S. Moorings RI Report describes sediment samples collected off-shore of the U.S. Moorings site as follows: "At depths between 20 – 40 inches the sediments are soft, brownish olive-gray, moist silty/clays (30/70) with evidence of both thin (<1"), gray sand stringers, and black bands of PAH enriched sediments, some with mineralized PAH layers." And "all the under-dock cores (except SDUD-4), Dredge Areas A and C, and at SDDB-20 the subsurface sediments contained black laminar bands of PAH enriched sediment with diffuse sheen and strong PAH odor." BaP was detected in the U.S. Moorings dock area at concentrations up to 39 mg/kg. The EPA will be evaluating the data to determine if portions of the U.S. Moorings area belong within the interim Project Area.	CDM/S	Evaluate	High
114	All alternatives need to consider the removal of substantial product consistent with the SOW. In addition, the interim boundary needs to encompass all areas with substantial product consistent with the SOW.	CDM/S	Evaluate	High
115	The removal action boundary should be expanded to include areas of elevated BaPEq located downstream in the vicinity of the dock areas at the U.S. Moorings site. BaP concentrations are present at levels up to 39 mg/kg. The EPA will be evaluating the data to determine if portions of the U.S. Moorings area belong within the interim Project	CDM/S	Evaluate	High
116	The EE/CA states that "sediment remediation is not expected to affect navigation to the U.S. Moorings Dock just downstream of the Gasco Sediments Site." Given the presence of elevated levels of Benzo (a) Pyrene and evidence of free product offshore of the U.S. Moorings facility, additional discussion of the U.S. Moorings Dock and berthing operations is required in this section.	CDM/S	Evaluate	High
117	The 1994 Preliminary Assessment completed by the U.S. Army Corps of Engineers for the U.S. Moorings facility included a series of sediment borings that showed evidence of product. In addition, the recent RI report completed by the U.S. Army Corps of Engineers also identified the presence of tar offshore of the U.S. Moorings facility. This information should be used to update the free product distribution figure (Figure 2.5.3-1) and should be incorporated into the revised interim action area.	CDM/S	Evaluate	High
118	The evaluation to determine the extent of "substantial product" should be expanded to include sediment cores collected off shore of the U.S. Moorings facility. The EPA will be evaluating data, including U.S. Mooring boring logs, to determine if portions of the U.S. Moorings area belong within the interim Project Area.	CDM/S	Evaluate	High
119	The project boundary discussed under Item 1 should incorporate the recent U.S. Moorings sediment data which shows BaPEq concentrations of up to 36 mg/kg in surface sediments outside the removal action boundary. The EPA will be evaluating data to determine if portions of the U.S. Moorings area belong within the interim Project Area.	CDM/S	Evaluate	High
120	It is unclear to DEQ why the Draft EE/CA boundary does not extend beyond the northern NW Natural property line given the extensive PAH and tar contamination detected in downstream sediments.	DEQ	Evaluate	High